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# Modeling thermal treatment in combination with acid treatment of a multilayer oil reservoir

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## Abstract

© 2015 Springer Science+Business Media New York. The problem of combined thermal and acid treatment in a multilayer crude-oil reservoir is examined for two-phase flows of fluid (water and crude oil) in a porous medium. A model in the form of a "bundle" of cylindrical capillaries of different radii is used to describe changes in the porosity and permeability of the porous medium as a result of chemical reaction between the acid and rock matrix, and the coalescence rate of the channels due to dissolution of pore walls is calculated based on the Smoluchowski equation. The recovery of crude oil in conventional flooding is compared with flooding with injection of a heat-transfer agent, and flooding using acid and the combination technology. It is shown that thermal treatment combined with acid treatment of a multilayer crude-oil formation provides the most effective oil production conditions.

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## Keywords

acid treatment, distribution function, mathematical modeling, oil recovery, thermal conductivity